THE EXPERIMENTAL AGRICULTURAL CONSERVATION PROGRAM IN LICKING COUNTY, OHIO

A Study of the Results in 1939

F. L. Morison

Department of Rural Economics
Mimeographed Bulletin No. 129

Ohio State University
and
Ohio Agricultural Experiment Station
in cooperation with
United States Department of Agriculture
Bureau of Agricultural Economics, and
Agricultural Adjustment Administration

Columbus, Ohio
June 1940

THE EXPERIMENTAL AGRICULTURAL CONSERVATION PROGRAM IN LICKING COUNTY, OHIO

(A Study of the Results in 1939)

In 1938 the Agricultural Adjustment Administration intiated an experimental agricultural conservation program in Licking County, Ohio. The program, now in its third year of operation, is based on a method of measuring the rate of soil improvement or deterioration developed by workers at the Ohio Agricultural Experiment Station and the Ohio State University. This method of measuring the approximate rate at which each crop or cropping practice adds to or subtracts from the productivity of the soil was devised by studying the results of crops and soils experiments in Ohio and in other states. One of the essential features of this special or experimental program is that a productivity balance value is computed for each farm by assigning to each acre of its various crops and cropping practices a plus or minus factor proportional to the restorative or depleting effect of that crop or practice on the productivity of the soil.* A partial list of productivity factors assigned to each acre or unit of practices follows:

Depleting crops or land use:

Corn	- 2.0
Wheat or rye	- 1.0
Oats or barley	- 0.9
Soybeans, hay or grain	- 0.5
Idle and bare during summer	- 2.0
Bare over winter (no cover crop)	- 0.5
Erosion (1/10 of the weighted average percent of slope of fields devoted to minus factor crops or uses other than growing winter or spring grains, 1/20 of the weighted average percent of slope of fields devoted to growing grain crops)	

Conserving crops or practices:

Alfalfa, year of seeding	+ 1.5
Alfalfa, 2nd year of stand	+ 1.0
Alfalfa, 3rd year of stand	+ 0.5
Red clover, year of seeding	+ 1.0
Red clover, 2nd year of stand	+ 1.0
Timothy	0.0
Soybeans, plowed under green	+ 1.5
Rye plowed under green	+ 0.5
Fertilizer (each 100 lbs. single strength)	+ 0.07
Lime (each 1000# yr. ground limestone)	+ 0.25

* For an itemized list of values, see appendix.

These factors or ratings show how crops affect soil productivity. Corn depletes the soil at the rate of approximately 2 per cent annually and is given a factor of minus 2. Alfalfa and clovers have restorative effects and are given plus ratings. The number of acres of each crop or land use is multiplied by the appropriate plus or minus factor for that crop; erosion effects are calculated for fields with minus factor crops or land uses; the net or algebraic sum of these products divided by the number of crop acres gives the productivity balance value for the farm for the year in question. The greater the excess of soil-depleting over soil building uses and practices the larger the deficit balance and the lower the position of the farm on the productivity balance scale.

In this special Licking County program the cropland conserving payment which a farm may earn is dependent (1) upon the actual productivity balance of the farm for the year in question, independent of any improvement over or decline from the preceeding year, and (2) upon the amount of improvement in the productivity balance value of that farm over the preceeding year. A maintenance or position payment was made at the rate of $1\frac{1}{4}$ cents per crop acre for each point (0.01) by which the productivity balance value was above the lower limit of the payment scale. For each farm this lower limit was set at -0.90 plus $\frac{1}{2}$ of the weighted erosion factor for the cropland on that farm. An upper limit, beyond which position payments were not made, was set at + 0.20. A building or improvement payment was made at the rate of $1\frac{1}{2}$ cents per crop acre for each point (0.01), up to a maximum of 40 points, by which the productivity balance value for 1939 exceeded that for 1938. These two payments were independent of each other.

Additional payments for noncrop pasture improvement (lime and fertilizer) and forest tree planting were available, independent of cropland conserving payments. Corn and wheat price-adjustment payments were made as in the regional program.

The program is unique in that it provides for greater flexibility in the operation of the individual farm. It permits the farmer to so adjust his farming business as to bring about a better balanced soil productivity in a number of ways. He can do this by reducing the acreage of depleting crops. On the other hand, a farmer may to some extent offset the deteriorating effect which his corn acreage has on the productivity-balance value of the farm by seeding more legumes, using more lime, leaving less land bare over winter, or plowing under more green manure crops. The conserving payments which a Licking County farmer may earn are not based on acreage allotments or appraised crop yields, nor are there any direct deductions for exceeding acreage allotments as in the regional program. He may be eligible to receive some payment for the performance of soil-conserving practices under the experimental program, even though he has exceed his corn acreage allotment, whereas under the regular regional program the farmer who exceeds his corn allotments by more than $22\frac{1}{2}$ per cent would receive no A.C.P. payment for corn and would probably find his entire conservation earnings wiped out by deductions for the excess corn acreage.

A study by the Bureau of Agricultural Economics, United States Department of Agriculture, and the Department of Rural Economics, Ohio Agricultural Experiment Station to compare the two programs was made in the summer of 1939. The purpose was to secure data before the completion of the 1939 programs on the effects of the Licking County program as contrasted with the regional program and on the amount of public funds expended for a given result. A preliminary report was made in November 1939.

Six areas around the Licking County boundary were selected for field study, one-half of each area in Licking County, the other half immediately across the county line in an adjacent county and operating under the regional program. Township census data for 1935, soil maps, and preliminary inspection trips were employed in selecting six sample Licking County townships that would cover the entire range of soils, topography, and types of farming found in the County and that at the same time, would be comparable with the adjacent townships outside the county. Practically all farms located in a solid block in each of these sample areas were included in the study; the only ones omitted were three farms that were abnormally large (all outside Licking County), a few for which the operators refused to give the desired information, and several small tracts without cropland. Data were secured for a total of 498 farms, 258 in Licking County, 240 in six adjacent counties. Field maps were prepared for each farm.

The following procedure was employed in getting the 1935-39 crop history of each farm. The crops grown on each field in 1935 and 1936 were secured from maps prepared for use in the 1936 program and on file in the county A.A.A. offices. The 1937, 1938, and 1939 history and practices were secured by interview with the farmers, and checked with the maps and compliance records on file in the county offices of the A.A.A. Acreages for all crops for the 5-year period 1935-39 are comparable, field acreages being brought up to date as farms were measured. As the last field interviews were made in July 1939 there is an element of estimate in connection with the acreage of soybeans to be cut for seed and for hay, in the acreage of wheat and rye to be seeded in the fall of 1939, and in the amount of land to be left bare over winter, the latter affecting the accuracy of the productivity-balance value calculation. But the percentage of error in these estimates is probably about the same in each of the two programs.

The adjacent areas were quite comparable. This is shown by the data in Table I on crop acres per farm and percentage distribution among the several crops. The farms included in the six Licking County areas studied were larger than those included in a study of a ten per cent random sample of all farms made by the A.A.A. The six-area study showed an average of 66.2 crop acres per farm, the A.A.A. study of all 26 townships an average of 50.2 crop acres. Thus, conclusions drawn from the 6-area data regarding the Licking County program are not entirely applicable to the county as a whole.

I. Data for All Farms in the Study

(a) Corn: In the Licking County areas there was a reduction of only 49 acres or 1 per cent from 1937 to 1938, and 147 acres or 2.9 per cent from 1938 to 1939, a total reduction of 3.9 per cent from the peak acreage in 1937 to the acreage in 1939. In the adjoining counties under the regional program the reduction during this 2 year period was 749 acres or 15.0 per cent. A total of 132 farms or 51.2 per cent of those in the Licking areas[1] kept within their 1939 corn allotments, as compared with 144 farms or 60 per cent of those in the regional areas.

In the educational phases of the Licking program most of the emphasis was placed on conservation and the effects of various crops and practices upon soil productivity, whereas in the regional program the emphasis was largely on allotments. In the Licking program there was no direct deduction in payments for excess acres of corn, such as was brought so clearly to the attention of the farmers in the adjoining counties. True, farmers in either group might earn a price-adjustment payment if they complied 100 per cent with their corn allotment, but apparently this payment was insufficient to induce the Licking County farmer to plant within his allotment. One of the objectionable features of the program was that it was difficult for the farmer to compute the effect of an additional acre of corn on his farm's productivity-balance value and its ultimate effect on the payment which his farm might earn.

(b) Wheat: From the peak year of 1938 to 1939 there was a reduction of 703 acres of wheat harvested in the Licking areas, a decline of 21.8 per cent; in the adjoining counties the reduction for the same period amounted to 818 acres of 23.9 per cent. A total of 99 out of the 110 Licking County farmers who complied with their wheat allotments did so at wheat planting time in the fall of 1938. The acreage of rye, and rye and wheat mixtures planted in Licking County was nearly double that planted in the adjoining areas. But this difference may be merely coincidental, since all these grains carried the same factor in figuring productivity balance. Only eleven of the Licking County farmers complying on wheat did so by pasturing, clipping, and plowing under a total of 13 acres of wheat. In the adjoining counties 122 of the farmers complied with their wheat allotments; however, only 77 of that number actually seeded less than their allotments, the other 45 earning the wheat price-adjustment payment by utilizing a total of 255 acres of wheat for purposes other than for grain.

A question might well be asked concerning the reason for the greater amount of clipping and pasturing in the regional program. Under that program a farmer might earn not only his ACP payment on wheat and his price-adjustment payment but he might also use this practice to come within his total soil-depleting allotment. In the Licking program wheat

(1) Data from the 10 per cent sample, referred to above, indicate that there was a 5.8 per cent reduction in Licking County corn acreage from 1938 to 1939, and that 51.6 per cent of the Licking County farms with corn allotments planted within their allotments.

TABLE I. Data for All Farms in the Study

		Licking County	Adjoining Counties
		258	240
Number of farms	1939	17,069--66.2 per farm	16,475-- 68.6 per farm
Crop Acreage	1939	27,433-106.3 per farm	26,043--108.5 per farm
Corn, acres, total and per 100 crop acres	1935	4,829--28.3	4,819--29.2
	1936	4,846--28.4	4,710--28.6
	1937	5,040--29.5	4,988--30.3
	1938	4,991--29.2	4,509--27.4
	1939	4,844--28.4	4,239--25.7
Corn allotment	1939	4,002--23.4	3,815--23.2
Wheat harvested	1935	3,184--18.7	3,200--19.4
	1936	3,030--17.6	3,398--20.6
	1937	2,986--17.5	3,026--18.4
	1938	3,233--18.9	3,420--20.8
	1939	2,530--14.8	2,602--15.8
Wheat seeded, fall of	1938	2,543--14.9	2,857--17.3
Wheat allotment	1939	2,196--12.9	2,251--13.7
Other small grains	1935	725-- 4.2	672-- 4.1
	1936	560-- 3.3	432-- 2.6
	1937	855-- 5.0	685-- 4.2
	1938	609-- 3.6	409-- 2.5
	1939	1,117-- 6.5	537-- 3.3
Soybeans, hay and grain	1935	919-- 5.4	686-- 4.2
	1936	1,039-- 6.1	739-- 4.5
	1937	1,013-- 5.9	891-- 5.4
	1938	1,054-- 6.2	983-- 6.0
	1939	1,449-- 8.5	1,197-- 7.3
Total depleting acres*	1935	9,847--57.7	9,432--57.3
*(Including soybean hay and clipped grains)	1936	9,625--56.4	9,313--56.5
	1937	10,054--58.9	9,666--58.7
	1938	10,030--58.8	9,398--57.0
	1939	10,004--58.6	8,991--54.6
Legumes seeded, acres, total and per 100 crop acres	1937	3,322--19.5	3,318--20.1
	1938	3,253--19.1	3,414--20.7
	1939	3,560--20.9	3,507--21.3

TABLE I (cont.). Data for All Farms in the Study

		Licking County	Adjoining Counties
Cropland bare over winter, acres	1937	3,387--19.8	2,799--17.0
	1938	3,442--20.2	2,758--16.7
	1939	2,781--16.3	2,168--13.2
Lime applied, tons	1937	202-- 1.2	384-- 2.3
	1938	240-- 1.4	159-- 1.0
	1939	702-- 4.1	456-- 2.8
Fertilizer applied, tons	1937	565-- 3.3	550-- 3.3
	1938	560-- 3.3	501-- 3.0
	1939	622-- 3.6	549-- 3.3
Productivity balance	1937	-- .79	-- .75
	1938	-- .71	-- .64
	1939	-- .62	-- .57
Farms with better balance in '39 than in '38		152	130
Conservation payments	1939	$13,682	$17,415
Farms receiving payments		216	157
Payment per farm participating		$63	$111
Per cent of farms participating		83.7	65.4

was given a factor of minus 1 in the calculation of productivity balance, regardless of whether it was harvested as grain or pastured - hence there was little incentive to pasture or clip wheat in excess of the wheat acreage allotment.

(c) Total depleting crops: Soybeans under the Licking program were given a rating of -.5, regardless of whether harvested for hay or seed; and pastured wheat or other grains were given the same minus factor as wheat harvested as grain. Hence, figures on total depleting crops under the two programs are comparable only when all soybeans and clipped and pastured grains are included. It will be noted that there was practically no decrease in the total of this item from 1937 to 1939 in the Licking area; in other words, reductions in corn and wheat were offset by increases in rye and soybeans. In the same period depleting crops were decreased 675 acres in the regional areas. This represented an adjustment of 7 per cent.

(d) Productivity balance: Productivity-balance values were calculated for all farms. During the 2 year period 1937-39 there was an improvement of 17 points in the productivity-balance value of the average farm in the Licking County areas, 18 points in the regional. Approximately 59 per cent of the farms in Licking County and 54 per cent of those in the regional areas made some improvement in their productivity balance values from 1938 to 1939. The Licking County farms, as a whole, reached a point almost as high on the scale as did farms in the surrounding counties in spite of smaller reductions in corn and total depleting crops. Greater use of lime and green-manure crops helped in bringing this about.

(e) Participation and payments: A total of 216 or 83.7 per cent of the farms in the Licking program received payments in 1939, averaging about $63 per farm. In the regional program in the adjoining counties a total of 157 farms or 65.4 per cent received payments amounting to about $111 per farm. Greater participation was one of the characteristics of the Licking County program. A large number of payments were made in Licking County on farms earning a maintenance payment only. Many of these farms would have received no payment under the regional program. With a higher participation under the special program, smaller average payments per farm resulted necessarily, since the 1939 budget for Licking County was determined by estimating the total payments that might have been earned under the regional program. Actual performance under the experimental program was not as complete in 1939 as had been estimated, so that payment rates could have been somewhat larger, without exceeding the budget for the county.

II. Farms Participating and In Full Corn Compliance in 1939

In Table II are data for participating farms planting within their 1939 corn acreage allotments. The Licking County farms in this classification reduced their corn acreage 22 per cent from 1938 to 1939, 98 of the 127 farmers planting less corn. In the adjoining areas the reduction in corn acreage was 13 per cent, 96 of the 141 farmers having fewer acres in 1939 than in 1938. It will be noted that 12 of the Licking County farms and 6 in the adjacent regional areas had no corn in 1939, this difference being in line with the larger number of small farms in the Licking County areas. Six of the 12 farms without corn had less than 20 crop acres each.

Farms in the Licking program received considerably less payment for essentially the same performance as to corn acreage reduction and improvement in productivity balance. This smaller payment is largely the result of higher participation in the experimental program and the expenditure of a relatively large proportion of all payments for maintenance. In the group of farms staying within their 1939 corn allotment the reduction in corn acreage from 1937 to 1939 was 25.5 per cent in Licking and 26.6 per cent in the surrounding counties. In productivity balance there was an improvement of 29 points in Licking and 26 points in the regional program. Payment over the two-year period was about $57 per farm larger in the regional than in the Licking program.

TABLE II. Farms Receiving A.C.P. Payments and planting within their 1939 Corn Allotments

		Licking County	Adjoining Counties
Number of farms*		127	141
Crop acreage	1939	8,801--69.3 per farm	10,067--71.4 per farm
Corn, acres, total and per 100 crop acres	1935	2,348--26.7	2,836--28.2
	1936	2,270--25.8	2,888--28.7
	1937	2,518--28.6	3,012--29.9
	1938	2,404--27.3	2,554--25.4
	1939	1,875--21.3	2,211--22.0
Corn allotment	1939	2,106--23.9	2,395--23.8
Farms with less corn in '39 than in '38		98	96
Farms with no corn planted in 1939		12	6
Wheat harvested	1935	1,645--18.7	1,909--19.0
	1936	1,609--18.3	1,921--19.1
	1937	1,529--17.4	1,866--18.5
	1938	1,656--18.8	2,096--20.8
	1939	1,322--15.0	1,333--13.2
Wheat allotment	1939	1,156--13.1	1,423--14.1
Total depleting acres* *(Including soybean hay and clipped grains)	1935	5,009--56.9	5,621--55.8
	1936	4,870--55.3	5,544--55.1
	1937	5,190--58.9	5,872--58.3
	1938	5,143--58.4	5,465--54.3
	1939	4,805--54.6	4,984--49.5
Productivity balance	1937	-.74	-.75
	1938	-.62	-.58
	1939	-.45	-.49
Farms with '39 balance better than '38		93	87
Conservation payment	1938	$7,499	$10,039
Conservation payment	1939	8,945	16,207
Payment per farm	1939	70.43	114.94
Payment per farm, total 2 years		129.50	186.14
Total payment, two years:			
Per point improvement in balance		4.47	7.16
Per 1 per cent reduction in corn		5.08	7.00

* In addition to these farms, there were 5 in Licking and 3 in the adjoining counties whose operators planted within their 1939 corn allotments but did not receive any A.C.P. payments.

III. Farms Participating but Planting More Than Their 1939 Corn Allotments

A rather large group of farmers in the Licking program was able to earn a payment either because of position or improvement on the productivity balance scale in 1939, in spite of having exceeded their corn

TABLE III. Farms Participating but Planting More Than Their 1939 Corn Allotments

		Licking County	Adjoining Counties
Number of farms		89	16
Crop acreage	1939	6,161--69.2 per farm	972--60.8--per farm
Corn acres, total and per 100 crop acres	1935	1,834--29.8	307--31.6
	1936	1,827--29.7	276--28.4
	1937	1,857--30.1	288--29.6
	1938	1,827--29.6	242--24.9
	1939	2,105--34.2	255--26.2
Corn allotment	1939	1,365--22.1	230--23.7
Farms with less corn in '39 than in '38		27	7
Wheat harvested	1935	1,170--19.0	185--19.0
	1936	1,182--19.2	250--25.7
	1937	1,187--19.3	151--15.5
	1938	1,302--21.1	234--24.1
	1939	936--15.2	142--14.6
Wheat allotment	1939	834--13.5	147--15.1
Total depleting acres* *(Including soybean hay and clipped grains)	1935	3,494--56.7	583--60.0
	1936	3,466--56.3	564--58.0
	1937	3,573--58.0	503--51.8
	1938	3,599--58.4	577--59.4
	1939	3,693--59.9	501--51.6
Productivity balance	1937	-.77	-.50
	1938	-.67	-.64
	1939	-.67	-.45
Farms with '39 balance better than '38		48	9
Conservation payments	1939	$4,723	$1,208
Payment per farm	1939	53.07	75.50

acreage allotments. The regional program, however, was so set up that those who planted in excess of 122.5% of their corn allottments received no agricultural conservation payment for corn. It will be noted that the Licking County farmers in this group exceeded their total corn allotment to a much greater degree than did those in the adjoining counties. In spite of this, however, a total of 27 of these 89 Licking County farmers had less corn than in 1938. Although the 89 had planted more than their corn acreage allotments, 48 of them moved up to an improved position on the productivity balance scale in 1939; the other 41 received a maintenance payment only by reason of having a productivity-balance value above the bottom of the payment scale. It should be pointed out that only a small percentage of these 89 farms would have received any payment had they been operating under the regional program.

IV. Nonparticipating Farms

In both programs the ratio of corn allotment to corn acreage history was lower on nonparticipating than on participating farms.

Because many had so far exceeded either their 1939 corn or wheat acreage allotments, only 12 of the 83 farmers not receiving a conserving payment in the regional program could have earned payment even if all had signed application for inspection. In the Licking program, however, 13 of the 18 who had not signed might have been eligible for payment. Seven of these were above the bottom of the payment scale and had a better productivity-balance value in 1939 than in 1938, so would have earned both maintenance and building payments; two would have been eligible for a maintenance payment only; and four, although below the bottom of the payment scale on position, might have received a building payment by reason of their improved productivity-balance value in 1939.

TABLE IV. Data for Nonparticipating Farms

		Licking County	Adjoining Counties
Number of farms		42	83
Crop acreage	1939	2,107--50.2 per farm	5,436--65.4 per farm
Corn acres, total and per 100 crop acres	1935	647--30.7	1,677--30.9
	1936	749--35.5	1,546--28.4
	1937	664--31.5	1,639--31.1
	1938	760--36.1	1,713--31.5
	1939	864--41.0	1,772--32.6
Corn allotment	1939	531--25.2	1,190--21.9
Farms with less corn in '39 than '38		14	35

TABLE IV. Data for Nonparticipating Farms (Cont.)

		Licking County	Adjoining Counties
Number of farms		42	83
Crop acreage	1939	2,107--50.2 per farm	5,436--65.4 per farm
Wheat harvested	1935	369--17.5	1,106--20.4
	1936	240--11.4	1,227--22.6
	1937	270--12.8	1,009--18.6
	1938	274--13.0	1,090--20.1
	1939	271--12.9	1,127--20.7
Wheat allotment	1939	206-- 9.8	682--12.5
Total depleting acres*	1935	1,344--63.8	3,228--59.4
*(Including soybean hay and clipped grains)	1936	1,288--61.1	3,205--59.0
	1937	1,291--61.3	3,291--60.5
	1938	1,288--61.1	3,353--61.7
	1939	1,506--71.5	3,503--64.5
Productivity Balance	1937	-1.01	-.78
	1938	-1.08	-.75
	1939	-1.19	-.75
Farms with '39 balance better than '38		11	34
Number not signing Form 303		18	69

V. Position on the Payment Scale

A bottom of the payment scale and a productivity-balance value were computed for each farm. It is of significance to note the relationship of position on the productivity-balance value scale to the per cent of cropland in corn, to the per cent of farms planting within their 1939 corn allotments, and to the per cent of farms receiving a cropland-conserving payment under both the Licking County Program and the regional program. The regional program might be called a "position" program, with payments based on acreage allotments, crop yields, and productivity indexes rather than shifts in cropping practices. In the Licking County program approximately 74 per cent of the cropland-conserving payments were for position, 26 per cent for improvement.

Fifteen of the 48 Licking County farms with 1939 productivity-balance values below the bottom of the payment scale were able to earn building payments by reason of some improvement in balance during the year. Ten out of 34 regional-area farms with low productivity-balance values in 1939 also received payments.

TABLE V. Position on Payment Scale and Related Factors

1939 position, points above or below bottom of payment scale	Number of farms	Productivity-balance value 1939	Crop land erosion factor	Crop land in corn 1939, Pct.	Per cent of farms Planting within their 1939 corn allotments	Per cent of farms Receiving conserving payments 1939	Total amount of conserving payments 1939
Licking County							
+ 90 and over	19	+.01	-.24	15.2	68.4	100.0	$1,350
+ 61 to + 90	66	-.35	-.32	20.7	69.7	97.0	5,383
+ 31 to + 60	81	-.52	-.22	26.7	59.2	97.5	5,199
+ 1 to + 30	44	-.79	-.16	31.4	31.8	88.6	1,275
- 1 to - 30	24	-1.11	-.12	40.0	29.2	41.7	369
- 31 and under	24	-1.50	-.06	50.3	16.6	20.8	106
Total	258	- .62	-.22	28.4	51.1	83.7	13,682
Adjoining Counties							
+ 90 and over	16	-.11	-.68	13.3	81.2	93.7	871
+ 61 to + 90	59	-.34	-.30	20.8	81.3	84.7	6,032
+ 31 to + 60	86	-.53	-.18	26.3	61.6	66.3	7,355
+ 1 to + 30	45	-.79	-.14	29.0	46.7	55.5	2,505
- 1 to - 30	17	-1.04	-.10	33.3	35.3	35.2	492
- 31 and under	17	-1.66	-.20	46.3	17.6	23.5	160
Total	240	- .57	-.24	25.7	60.0	65.4	17,415

VI. Improvement in Productivity Balance During the Year

It is to be noted in Table VI that the greater the extent of improvement in soil-productivity balance the greater the reduction in corn acreage. In each case, the groups making the greatest improvement in soil productivity balance had the highest percentage of their cropland in corn in 1938.

Approximately 41 percent of the farms in the Licking County areas did not improve in productivity balance in 1939 as compared with 46 per cent in the adjacent regional areas. Many of these Licking County farmers were eligible to receive a maintenance payment under the experimental program. In fact, 75 of the 216 farms receiving payment were in this class, and they received about 25 per cent of the cropland-conserving payments made to all farms. In the adjoining regional areas nearly 39 percent of all conserving payments went to farms on which the calculated soil-productivity-balance values declined from 1938 to 1939.

In the Licking County program the greater the improvement in productivity balance and the larger the reduction in corn acreage from the previous year, the larger the payments per farm and per crop acre.

TABLE VI. Change in Productivity-Balance Value, 1938 to 1939, and Related Factors

Points increase or decrease in balance, 1938 to 1939	Total number of farms	Weighted productivity balance value		Per cent of cropland in corn		Shift in corn acreage 1938-'39	Per cent of farms receiving payment 1939	Cropland conserving payments, 1939		
		1938	1939	1938	1939			Total	Per farm participating	Per crop acre, participating farms
						Pct.		Dol.	Dol.	Dol.
Licking County										
+ 46 or more	40	-1.29	- .61	39.3	32.2	-18.1	87.5	2,598	74.23	1.24
+ 31 to + 45	21	- .93	- .58	33.6	27.3	-18.7	90.5	1,645	86.57	1.18
+ 16 to + 30	29	- .77	- .55	29.2	26.8	- 8.5	89.6	2,022	77.78	1.12
+ 1 to + 15	62	- .57	- .49	26.2	24.4	- 6.6	98.4	4,042	66.26	.86
0 to - 15	48	- .57	- .64	26.5	27.4	+ 4.5	72.9	1,886	53.89	.76
- 16 to - 30	32	- .60	- .83	30.2	30.0	0	78.1	1,047	41.88	.62
- 31 or more	26	- .31	- .92	24.3	39.5	+68.0	57.7	442	29.46	.55
Total	258	- .71	- .62	29.2	28.4	- 3.0	83.7	13,682	63.34	.91
Adjoining Counties										
+ 46 or more	36	-1.34	- .58	37.1	23.9	-35.6	58.3	1,774	84.46	1.43
+ 31 to + 45	23	- .80	- .44	29.8	24.5	-17.8	73.9	1,841	108.28	1.60
+ 16 to + 30	25	- .69	- .45	27.6	22.8	-17.2	76.0	2,589	136.28	1.53
+ 1 to + 15	46	- .59	- .51	27.5	24.8	- 9.7	84.8	4,455	114.24	1.60
0 to - 15	53	- .48	- .57	24.7	26.1	+ 6.9	58.5	3,479	112.23	1.60
- 16 to - 30	29	- .44	- .67	25.1	27.2	+ 8.1	55.2	1,875	117.17	1.69
- 31 or more	28	- .32	- .82	23.1	31.1	+35.1	50.0	1,402	100.13	1.58
Total	240	- .64	- .57	27.4	25.7	- 6.0	65.4	17,415	110.92	1.58

No such relationship between payments made and shift in corn acreage or improvement in soil productivity was found in the regional areas. Payments per participating farm and per crop acre were much more uniform in regional program counties than in Licking County. Actually, in the regional program, conservation payments to that group which had the largest losses in productivity balance and which increased their 1939 corn acreage 35.1 per cent over that of 1938 were somewhat larger than those to the group which made the greatest improvement in balance and decreased their corn acreage 35.6 per cent.

A considerable part of this observed difference between Licking County and adjoining counties in the relationships between improvement in productivity balance, reduction in corn acreage from the previous year, and payment per farm and per acre of cropland is no doubt accounted for by the fact that in determining corn allotments under the regional program the usual corn history was based upon the average acreage in 1936 and 1937, while under the Licking County program the usual history was based upon the average acreage in 1937 and 1938. Also under the regional program, payments were influenced by corn yields and productivity indexes.

VII. Size of Farm

The smaller degree of participation of small farms in both the Licking and regional programs is shown in Table VII. In both areas, the percentage of farmers receiving payments increased with the size of the farm. In the areas in the regional program small farms planted within their 1939 corn allotments to a lesser degree than did farms with more than 40 crop acres. In those areas low participation may be due in part to a less favorable relationship existing between corn allotments and corn history on the small farms. In general, larger than average farms had 1939 corn allotments more nearly approaching their average 1935-38 corn acreage than did farms with fewer crop acres. In the Licking County program small farms with one or two crop fields fluctuated more widely in productivity balance than did larger farms and hence relatively fewer of them were in a position to participate. A small tract with all of its cropland in clover-timothy hay or pasture one year would have a productivity balance of + 0.5; the next year it might be in corn with a balance of -2.0; then, if in wheat seeded to clover, it would rate a 0 balance. A farm with two fields for each crop in the rotation has a much better opportunity to run along on an even keel.

VIII. Productivity of the Farm

The farms in each program were sorted on the basis of their appraised yield of corn, as recorded in the county A.C.P. office. It is of particular interest to note that the low-yield groups were smaller than average farms whereas groups appraised at higher than average yields were farms above the average in size, as measured by number of crop acres. Corn acreage allotments increased with increased yield per acre, productivity of the farm as well as corn history being taken into account in the determination of corn acreage allotment. (Table VIII.)

TABLE VII. Size of Farm and Participation

Crop Acres	Number of farms	Crop acres per farm	Per 100 acres cropland: Corn acreage, 1935-38 average	Per 100 acres cropland: 1939 corn allotment	Ratio allotment to history, per cent	Per cent of all farms: Within their 1939 corn allotment	Per cent of all farms: Receiving A.C.P. payment 1938	Per cent of all farms: Receiving A.C.P. payment 1939	Conserving payment per farm participating
Licking County									
0.1 to 10.0	6	6.8	19.0	7.2	37.9	33.3	66.6	66.6	$11.63
10.1 to 20.0	17	15.6	30.6	20.7	67.6	52.9	70.6	70.6	22.80
20.1 to 40.0	51	31.1	31.2	24.5	78.5	49.0	70.6	76.5	32.06
40.1 to 60.0	58	50.4	29.5	23.0	77.9	50.0	82.7	81.0	47.38
60.1 to 80.0	56	70.2	25.7	21.5	83.7	48.2	91.1	89.3	67.16
80.1 to 100.0	28	89.3	26.2	22.6	86.3	71.4	78.6	92.8	81.08
100.1 and over	42	138.6	31.0	25.2	81.3	52.3	92.9	90.5	116.26
Total	258	66.2	28.9	23.4	81.2	51.2	82.2	83.7	63.34
Adjoining Counties									
0.1 to 10.0	4	5.2	11.1	4.4	39.6	25.0	50.0	50.0	9.02
10.1 to 20.0	8	15.8	21.4	16.2	75.7	50.0	37.5	62.5	15.44
20.1 to 40.0	41	32.2	31.3	23.1	73.8	48.9	43.9	56.1	48.87
40.1 to 60.0	60	51.6	30.0	23.4	78.0	61.7	46.7	61.7	86.58
60.1 to 80.0	52	68.9	27.5	22.5	81.8	67.3	53.8	76.9	103.12
80.1 to 100.0	40	89.2	27.7	23.1	83.4	60.0	62.5	65.0	139.17
100.1 and over	35	132.2	29.4	23.8	81.0	65.7	62.9	68.6	218.82
Total	240	68.6	28.9	23.2	80.2	60.0	52.5	65.4	110.92

TABLE VIII. Appraised Productivity of Farms and Other Factors

Appraised yield of corn, bu. per acre	Number of farms	Average corn yield, bu. per acre	Crop acres per farm	Per 100 acres cropland		Per cent of farms		Conserving payment per farm participating
				Corn acreage 1935-'38 average	1939 corn allotment	Within their 1939 corn allotment	Receiving A.C.P. payment 1939	
Licking County								
Under 32.5	42	23.6	47.0	22.8	16.6	52.4	85.7	$49.95
32.6 to 37.5	59	35.7	56.1	27.2	19.8	40.7	74.6	56.94
37.6 to 42.5	71	39.9	65.8	26.7	22.5	50.7	85.9	59.99
42.6 to 47.5	46	43.9	75.6	29.8	24.8	52.2	82.6	74.69
47.6 and over	40	50.8	90.8	35.5	30.4	65.0	92.5	77.87
Total	258	41.4	66.2	28.9	23.4	51.2	83.7	63.34
Adjoining Counties								
Under 32.5	45	28.4	50.7	24.9	18.7	53.3	55.5	50.75
32.6 to 37.5	61	35.2	58.3	26.6	20.7	59.0	63.9	85.43
37.6 to 42.5	66	39.9	71.4	30.5	24.2	59.1	66.7	101.19
42.6 to 47.5	39	45.0	78.7	30.5	25.0	59.0	66.7	152.88
47.6 and over	29	49.8	98.5	30.5	26.0	75.9	79.3	190.74
Total	240	40.7	68.6	28.9	23.2	60.0	65.4	110.92

In general, farms with low yields per acre complied with their smaller corn allotments to a lesser extent than did farms with larger appraised yields. In the Licking County program there was no such distinct relationship between yield per acre and per cent of farms participating in conserving payments as was found in the regional program. It will be recalled that crop yield was not one of the factors determining payment rates in the experimental program.

In the Licking program in 1939 the amount of payment made to a farm of a given size was determined by its position on the productivity balance scale in 1939 and the amount of improvement, if any, over 1938. In the regional program, however, the payment to a farm of that size was dependent on the size of its corn, wheat and total depleting acreage allotments, its appraised productivity index or yield per acre, and the degree to which the operator complied with the farm's allotments. Table VIII illustrates this significant difference in payments. In the Licking County program a farm with 100 acres of cropland of hilly topography and low yield per acre, may earn as much as a level, highly productive farm of the same size. In this respect the two programs are widely different.

IX. Corn Allotments vs. Corn History

Not all farms had 1939 corn acreage allotments that were proportional to their 1935-38 planted acreages of corn. In other words, there was considerable range in the reductions which individual farms had to make in order to meet their 1939 corn allotments. Some farms had 1939 allotments in excess of their previous 4 year corn history, while on others the allotments were less than sixty per cent of the average corn acreage planted during the years 1935-38.

Table IX shows all farms in both programs sorted on the basis of the acres of corn adjustment required per 100 acres of cropland. In both Licking County and adjoining counties the farms on which the greatest adjustments were required were those on which the acreage planted in 1935-38 per 100 acres of cropland were greatest. The largest degree of full compliance with corn allotments was found in the groups with the smallest required adjustments, and the smaller the adjustment required the higher the percentage of farms receiving conservation payments. In both respects this situation was more marked in regional program counties because under the Licking County program it was possible to earn relatively larger payments on those farms on which corn allotments were exceeded than could have been earned under the regional program.

Compliance in these groups, however, did not account for a very large part of the total reduction in corn acreage. Thus, in each program the two upper groups (up to 4 acres of corn adjustment required per 100 crop acres) comprised slightly more than one-third of the corn acreage, accounted for about one-sixth of reduction in corn acreage from 1937 to 1939, yet received more than one-half of the corn price-adjustment payments that were made.

TABLE IX. Corn Adjustment Required and Participation

1939 corn acreage adjustment required from 1935 - 38 corn acreage, per 100 acres of cropland	Number of farms	Corn per 100 A. cropland: Acres planted 1935-1938	Acres planted 1938	Allotment 1939	Acres planted 1939	Per cent of required adjustment obtained 1939	Per cent of farms: In full corn compliance 1939	Receiving conservation payments 1939	Percentage Distribution: 1935-1938 corn acres	Corn reduction 1937 to 1939	Corn price adjustment payments
Licking County											
None	46	20.6	26.0	23.8	22.9	--	76.1	87.0	12.6	6.6	28.8
0.1 to 4.0	59	25.1	26.2	22.7	26.0	0	67.8	93.2	23.3	8.6	31.8
4.1 to 8.0	76	28.5	27.8	22.6	27.7	13.9	42.1	86.8	31.2	43.9	25.7
8.1 to 12.0	26	31.4	29.9	21.8	26.9	46.7	38.5	69.2	8.2	16.9	4.4
12.1 and over	51	43.2	40.0	26.6	40.0	19.7	29.4	72.5	24.7	24.0	9.3
Total	258	28.9	29.2	23.4	28.4	9.0	51.2	83.7	100.0	100.0	100.0
Adjoining Counties											
None	28	19.2	17.5	21.1	20.2	--	75.0	89.3	8.0	- .7	14.7
0.1 to 4.0	72	25.6	23.6	23.2	24.8	36.6	73.6	76.4	29.9	17.4	38.6
4.1 to 8.0	64	28.4	26.7	22.7	25.9	43.6	54.7	62.5	24.9	20.2	22.5
8.1 to 12.0	40	34.2	32.3	24.2	28.5	57.0	57.5	62.5	21.6	36.0	17.7
12.1 and over	36	42.1	43.5	24.6	29.9	69.9	33.3	33.3	15.6	27.1	6.5
Total	240	28.9	27.4	23.2	25.7	55.0	60.0	65.7	100.0	100.0	100.0

TABLE X. Soil-Management Practices as Related to Farm Tenure

	Operated by owners and related Tenants		Operated by non-related Tenants	
Number of farms	320		178	
Total acres per farm	108.8		104.3	
Crop acres per farm	67.9		66.3	
	Per 100 acres of crop land			
	1938	1939	1938	1939
Corn, acres	27.3	25.9	30.1	29.2
Wheat, acres	20.3	15.2	19.0	15.5
Other depleting crops, acres	10.3	13.5	14.6	19.2
Conserving crops, acres	42.1	45.4	36.3	36.1
Total	100.0	100.0	100.0	100.0
Land bare over winter, acres	15.4	11.5	24.5	20.6
Legumes seeded, acres	21.3	21.4	17.4	20.4
Fertilizer applied, tons	3.3	3.5	2.9	3.4
Lime applied, tons	1.3	3.6	.6	2.7
Corn acreage reduction, '38 to '39	5.3%		2.9%	
Wheat acreage reduction, '38 to '39	25.3%		18.0%	
No. farms under '39 corn allotment	190		86	
Per cent farms under corn allotment	59.4		48.2	
Farms receiving A.C.P. payments	247		126	
Per cent farms receiving payment	77.2		70.8	
Productivity balance, 1938	-.62		-.77	
Productivity balance, 1939	-.54		-.70	

X. Tenancy

System of tenure has some bearing on the degree of participation in the conservation program. In this comparison the farms of all areas were thrown together into two groups, (1) those operated by owners and tenants related to owners, and (2) those operated by non-related tenants.

Several significant differences may be noted. On tenant-operated farms there was a larger proportion of the cropland in corn and other depleting crops and less in conserving crops, more land left bare over winter, a smaller acreage of legumes seeded and less lime used. The reduction in acreage of corn and of wheat from 1938 to 1939 was less on farms operated by tenants. Tenants participated in conservation payments to a smaller extent than did owners and fewer of them planted under their 1939 corn allotments. The figure on productivity-balance shows that soils on tenant-operated farms are being depleted faster than land farmed by its owners. But the 498 farms varied widely in the extent to which they approached a balanced soil productivity. It should not be inferred that all tenants handle their farms badly and that all owners take good care of the soil.

XI. Changes in the 1940 Program

The experimental program in Licking County was not as effective as the regional program in bringing about a reduction in the acreage of corn. Too large a proportion of Licking County farmers who had not planted within their 1939 corn allotments increased their acreages of corn, and were still in a position to earn a maintenance payment. In an attempt to equalize the results of the two programs, the following modifications have been made in the Licking County program for 1940:

(1) The lower limit of the cropland-maintenance-payment scale was raised from - (.90 + $\frac{1}{2}$ the erosion factor) to - (.70 + $\frac{1}{2}$ the erosion factor).

(2) The upper limit of the payment scale was reduced from + .20 to + .10.

(3) The rate of maintenance payment for each acre of cropland was raised from $1\frac{1}{4}$ cents to $1\frac{1}{2}$ cents for each point (.01) by which the current productivity-balance value is above the lower limit of the payment scale.

(4) The rate of building payment for each acre of cropland was raised from $1\frac{1}{2}$ cents to 2.0 cents for each point (.01) of improvement, up to a limit of 40 points.

It is to be expected that narrowing the range within which maintenance payments will be made and increasing the rates of payment will induce more farmers to do a better job of farming than they did in 1939. A greater improvement in productivity-balance value is likely to be accompanied by a smaller acreage of corn.

XII. Appendix:

Classification of Land Use or Treatment with Associated Productivity Factors

The acreage of cropland upon a farm in 1938 and in 1939 shall be classified according to its use or treatment in such year and shall receive appropriate productivity factor as follows:

1.	**Cropland not Planted.**	
	a. Cropland idle and bare during season	-2.0
	b. Cropland idle but not bare nor fallowed during season	-0.5
	c. Cropland fallowed during season	-2.0
2.	**Cropland Planted to Field Crops for Harvesting Within the Crop Year.**	
	a. Field corn for silage or grain harvested or hogged off	-2.0
	b. Winter-grains (Wheat, rye) harvested as grain, hay or pasture, including hogged off	-1.0
	c. Spring or summer seeded small grains (oats, barley, flax, buckwheat) harvested as grain, hay, or pasture	-0.9
	d. Soybeans or cowpeas harvested as seed or hay	-0.5
	e. Sudan grass harvested as hay or pasture	-1.5
	f. Millet harvested as hay or pasture	-1.5
	g. Sorghums for harvesting	-2.0
	h. Rape for pasture	-1.0
	i. Cropland planted to a crop for harvesting within the crop year, not fall plowed but bare of sod or of winter cover crop as of October 31, 1939. (This factor to be applied in addition to any other factor applicable to such cropland).	-0.5
3.	**Cropland on which is Growing a Good Stand of Hay or Pasture Plants.** For a land use to be classified as producing one of the crops listed in this subsection 3, at least 75 per cent of the stand must be of that particular crop.	
	a. Alfalfa, stand in year of seeding	+1.5
	b. Alfalfa, 2nd year stand	+1.0
	c. Alfalfa, 3rd year stand	+0.5
	d. Alfalfa, 4th year, and more, stand	0.0
	e. Sweet clover (biennial) year of seeding	+1.5
	f. Sweet clover, 2nd year of growth, pastured or cut for hay	+1.0
	g. Sweet clover, 2nd year of growth, not pastured or cut for hay	+1.5
	h. Clovers, (red, mammoth, alsike) year of seeding	+1.0
	i. Clovers, (red, alsike, mammoth) 2nd year of growth, pastured or cut for hay	+1.0
	j. Clovers, (red, alsike, mammoth) 2nd year of growth, not pastured or cut for hay	+1.5
	k. Alfalfa-grass mixtures, year of seeding	+1.5
	l. Alfalfa-grass mixtures, 2nd year of growth	+0.5

m. Alfalfa-grass mixtures, 3rd year of growth	+0.5
n. Alfalfa-grass mixtures, 4th year of growth	0.0
o. Clover-grass mixtures, year of seeding	+0.5
p. Clover-grass mixtures, 2nd year of growth	+0.5
q. Timothy, orchard grass, or mixtures regardless of year of seeding	0.0
r. Bluegrass and other permanent pasture grasses	0.0
s. Lespedeza, cut for hay or pastured	+0.5
t. Lespedeza, not cut for hay or pastured	+1.0

Any of these crops grown from unadapted seed planted between November 1, 1938, and October 31, 1939, shall receive a productivity factor of 0.0

4. Cropland into Which is Incorporated a Green Manure or a Residue Crop.

a. Sweet clover, 2nd year of growth, not pastured, plowed under green prior to June 1	+1.0
b. Sweet clover, 2nd year of growth, not pastured nor cut for hay or seed, plowed under after June 1	+2.0
c. Alfalfa, 2nd or more years of growth, not pastured and plowed under green prior to June 1	+1.0
d. Alfalfa, 2nd or later years of growth, not pastured nor cut for hay or seed, plowed under green after June 1	+2.0
e. Clovers(red, alsike, mammoth), 2nd year of growth, not pastured and plowed under green prior to June 1	+0.75
f. Clovers (red, alsike, mammoth), 2nd year of growth, not pastured nor cut for hay or seed, plowed under after June 1	+1.75
g. Soybeans, cowpeas, or vetch, entire plant plowed under in bloom stage	+1.5
h. Rye, wheat, or buckwheat not pastured, plowed under green with at least sixty days of growth	+0.5
i. Sweet corn, entire stalk and leaves plowed under green after removal of ears (this factor in addition to that indicated under subsection 5	+0.5
j. Field corn, drilled solid and entire plant plowed under green in tassel stage	+1.5

5. Cropland Planted to Vegetables and Special Crops for Harvesting within the Crop Year.

a. Popcorn for harvesting	-1.5
b. Sweet corn harvested for market or canning	-1.5
c. Sweet corn for other uses	-2.0
d. Tomatoes, Irish potatoes, sweet potatoes, onions, melons, pumpkins, cucumbers and turnips for harvesting	-2.0
e. Cabbage for harvesting	-1.5
f. Canning peas, field peas, field beans for harvesting	-0.5

6. Cropland Occupied by Fruit or Forest Tree Plantings.

a. Noncommercial Orchards (entire acreages) (Orchards interplanted, in addition to this factor shall receive the factor assigned to the interplanted crop for the acreage of such interplanted crop)	-2.5
b. Cane and Bush Fruits	-2.0
c. Rhubarb	-1.0
d. Asparagus	-1.0
e. Forest Trees and Windbreaks	0.0

7. Commercial Fertilizer Applied to Cropland.
   a. For each 100 lbs. of single strength* commercial fertilizer +0.07

   *Note - 20 units of plant nutrients constitute a single strength fertilizer. Example: 2-12-6, 2-16-2, 0-14-6, 0-20-0.

8. Limestone Applied to Cropland.
   a. For each 1,000 lbs. of "agricultural ground limestone" possessing a neutralizing power of 90 to 108 +0.25
   b. For each 1,000 lbs. of "agricultural meal" possessing a neutralizing power of 90 to 108 +0.20
   c. For each 1,000 lbs. of "pulverized limestone" possessing a neutralizing power of 90 to 108 +0.30
   d. For each 1,000 lbs. of "hydrated lime" possessing a neutralizing power of 120 to 154 +0.40
   e. For each 1,000 lbs. of "hydrated lime" possessing a neutralizing power of 155 to 175 +0.50

9. Cropland Contour Tilled or Strip Cropped on the Contour.
   a. Cropland on which intertilled crops are tilled on the contour - a positive productivity factor equal to 30 per cent of the erosion factor for such cropland.
   b. Cropland strip cropped on the contour with alternate strips of intertilled crops and sown, close-drilled, or sod crops -- a positive productivity factor equal to 60 per cent of the erosion factor for such intertilled cropland and a positive productivity factor equal to 30 per cent of the erosion factor for other negative value crops.

   The factors under a and b of this subsection 9 shall apply only to cropland having a slope greater than 2 per cent and not in excess of 24 per cent, and the same cropland shall not be eligible to receive more than one of such factors.